REMARKS

I. INTRODUCTION

In response to the Final Office Action dated July 16, 2002, no claims have been amended. Claims 1-35 remain in the application.

II. STATUS OF CLAIMS

Claims 1-35 are pending in the application.

In the first Office Action mailed February 13, 2002:

claims 1, 2, 11, 12, 21, and 22 were rejected under 35 U.S.C. § 103(a) as unpatentable over the U.S. Patent 6,282,701, issued to Wygodny (Wygodny), U.S. Patent No. 5,726,913, issued to Grimsrud (Grimsrud), and U.S. Patent 5,926,813, issued to Chaudhuri;

claims 3, 13, and 23 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 5,613, 113, issued to Goldring (Goldring);

claims 4, 14, and 24 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 5,978,928, issued to Rust (Rust);

claims 5, 15, and 25 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 6,243,702, issued to Bamford (Bamford);

claims 6, 16, and 26 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 5,625,815, issued to Maier (Maier);

claims 7, 17, and 27 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, Maier, and further in view of U.S. Patent No. 6,185,575 issued to Orcutt (Orcutt);

claims 8, 18, and 28 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, Maier, and further in view of Orcutt;

claims 9, 19, and 29 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 6,021,433, issued to Pizano (Pizano);

claims 10, 20, and 30 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wygodny, Grimsrud, Chaudhuri, Pizano, and further in view of U.S. Patent No. 4,772,966, issued to Sharples (Sharples);

claims 31-33 were rejected under 35 U.S.C. § 103(a) as unpatentable over Chaudhuri, Wygodny, Grimsrud, and U.S. Patent No. 5,857,180, issued to Hallmark et al (Hallmark);
claim 34 was rejected under 35 U.S.C. § 103(a) as unpatentable over Chaudhuri, Wygodny, Grimsrud, Hallmark, and in further view of Rust; and
claim 35 was rejected under 35 U.S.C. § 103(a) as unpatentable over Chaudhuri, Wygodny, Grimsrud, Hallmark, and in further view of Bamford.

on May 9, 2002, the Applicants filed Remarks under 37 C.F.R. § 1.111, traversing all rejections without amendments; and

a Final Office Action was mailed July 16, 2002, maintaining each rejection.

III. SUMMARY OF THE INVENTION

The Applicants' invention discloses a method, apparatus, article of manufacture, and a memory structure for monitoring an executed query comprising at least one execution thread. The method comprises the steps of executing the query; and while executing the query, storing an execution trace record for each execution thread in at least one execution log file. The execution trace record comprises execution trace information including a thread ID and a time stamp for the execution thread. The execution trace information can be recalled from the execution log file and presented to a user after execution of the query to allow post mortem analysis of the query. The article of manufacture comprises a program storage device tangibly embodying instructions for performing the method steps described above. The apparatus comprises a data server for executing the execution thread and for storing an execution trace record for the executed execution thread, the execution trace record having execution trace information including a thread identifier and a time stamp; a query coordinator, for storing an execution plan having a time stamp and for retrieving and

synchronizing the execution trace record and the execution plan; and a client process for displaying the retrieved execution trace information to a user after execution of the query.

IV. ISSUES PRESENTED FOR REVIEW

Whether:

claims 1, 2, 11, 12, 21, and 22 are patentable over the U.S. Patent 6,282,701, issued to Wygodny (Wygodny), U.S. Patent No. 5,726,913, issued to Grimsrud (Grimsrud), and U.S. Patent 5,926,813, issued to Chaudhuri;

claims 3, 13, and 23 are patentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 5,613, 113, issued to Goldring (Goldring);

claims 4, 14, and 24 are patentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 5,978,928, issued to Rust (Rust);

claims 5, 15, and 25 are patentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 6,243,702, issued to Bamford (Bamford);

claims 6, 16, and 26 are patentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 5,625,815, issued to Maier (Maier);

claims 7, 17, and 27 are patentable over Wygodny, Grimsrud, Chaudhuri, Maier, and further in view of U.S. Patent No. 6,185,575 issued to Orcutt (Orcutt);

claims 8, 18, and 28 are patentable over Wygodny, Grimsrud, Chaudhuri, Maier, and further in view of Orcutt;

claims 9, 19, and 29 are patentable over Wygodny, Grimsrud, Chaudhuri, and further in view of U.S. Patent No. 6,021,433, issued to Pizano (Pizano);

claims 10, 20, and 30 are patentable over Wygodny, Grimsrud, Chaudhuri, Pizano, and further in view of U.S. Patent No. 4,772,966, issued to Sharples (Sharples);

claims 31-33 are patentable over Chaudhuri, Wygodny, Grimsrud, and U.S. Patent No. 5,857,180, issued to Hallmark et al (Hallmark); and

claims 34 was rejected under 35 U.S.C. § 103(a) as unpatentable over Chaudhuri, Wygodny, Grimsrud, Hallmark, and in further view of Rust.

In particular:

(1) whether the Chaudhuri reference teaches storing an execution trace record for each execution thread while executing a query, and

(2) whether the Office has presented a prima facie case for obviousness by presenting a teaching or suggestion for combining the above references.

V. GROUPING OF CLAIMS

The rejected claims do not stand or fall together. Each claim is independently patentable.

VI. ARGUMENTS

A. Rejections Under 35 U.S.C. § 103(a)

1. The Rejection of claims 1, 2, 11, and 12

In item 1 of the Final Office Action, claims 1, 2, 11, 12, and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Wygodny reference in view of the Grimsrud reference, and further in view of the Chaudhuri reference. The Applicants respectfully traverse these rejections

a) The References

(1) The Wygodny Reference

U.S. Patent No. 6,282,701 issued August 28, 2001 to Wygodny et al. (hereinafter, the Wygodny reference) discloses a system and method for monitoring and analyzing the execution of computer programs. A software system is disclosed which facilitates the process of tracing the execution paths of a program, called the client. The tracing is performed without requiring modifications to the executable or source code files of the client. Trace data collected during the tracing operation is collected according to instructions in a trace options file. At run time, the tracing library attaches to the memory image of the client. The tracing library is configured to monitor execution of the client and to collect trace data, based on selections in the trace options file. The developer then uses a trace analyzer program, also having a graphical user interface, to view the trace

information. The system can trace multiple threads and multiple processes. The tracing library is preferably configured to runs in the same process memory space as the client thereby tracing the execution of the client program without the need for context switches. The tracing system provides a remote mode and an online mode. In remote mode, the developer sends the trace control information to a remote user site together with a small executable image called the agent that enables a remote customer, to generate a trace file that represents execution of the client application at the remote site. In online mode, the developer can generate trace options, run and trace the client, and display the trace results in near real-time on the display screen during execution of the client program.

(2) The Grimsrud Reference

U.S. Patent No. 5,726,913, issued March 10, 1998 to Grimsrud (hereinafter, the Grimsrud reference) discloses a method and apparatus for analyzing interactions between workloads and locality dependent subsystems. A locality characteristic generator and a response surface characteristic generator are provided either jointly or separately to one or more computer systems for generating locality characteristic data for workloads, and response surface characteristic data for locality dependent subsystem, independent of each other, which in turn are used to generate independent locality and response surface characteristic profiles. Each locality characteristic profile reflects the probability that the first occurrence of an access to a location with a stride of size s from the current location takes place between the reference distance of d/2 to d from the current reference. Each response surface characteristic profile reflects what the expected response time will be if the first occurrence of an access to a location having a stride of size s from the current location takes place between the reference distance of d/2 to d from the current reference. Accordingly, any one of the locality characteristic profiles can be used in conjunction with any one of the independent response surface characteristic profiles to analyze the interaction between the particular combination of workload and locality dependent subsystem. Alternatively, the generated locality and response characteristic data can be used to generate performance indices for various combinations of workloads and locality dependent subsystems.

(3) The Chaudhuri Reference

U.S. Patent No. 5,926,813, issued July 20, 1999 to Chaudhuri et al. (hereinafter, the Chaudhuri reference) discloses a database system index selection using cost evaluation of a workload for multiple candidate index configurations. An index selection tool helps reduce costs in time and memory in selecting an index configuration or set of indexes for use by a database server in accessing a database in accordance with a workload of queries. The index selection tool attempts to reduce the number of indexes to be considered, the number of index configurations to be enumerated, and the number of invocations of a query optimizer in selecting an index configuration for the workload.

b) Claims 1, 2, 11, 12, and 21 are Patentable

The Court of Appeals for the Federal Circuit has cautioned:

> "[I]t is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious. ... This court has previously stated that '[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.'" *In re Fritch*, 972 F.2d at 1266, 23 USPQ2d at 1784 (1992).

In rejecting claims 1, 2, 11, 12, and 21, the Final Office Action violates this mandate ... it relies on inappropriate hindsight reconstruction and uses the Applicants' disclosure to pick and choose limitation of references which are at best, remotely related.

The Final Office Action acknowledges that Wygodny does not teach the use of execution trace records or the obtaining of trace information during a query. The first Office Action argued that obtaining trace records during the query was disclosed by the Chaudhuri reference as follows:

> "A first estimated cost of the query for a given atomic index configuration may be determined using a query optimizer of a database server that is to execute the query against the database." (col. 2, lines 21-24)

and

> "Workload 304 comprises a set of queries to be executed against database 210. For embodiments supporting SQL queries, workload 304 may be generated using SQL Trace utility, for example." (col. 5, lines 61-64)

In response, the Applicants pointed out that the first passage merely indicates that a cost estimate is performed using a query optimizer, which are typically *pre-processors*, inferring that the execution trace information is not obtained during the query. The Applicants also pointed out that the second statement indicates that a set of queries to be executed against the database (a workload) may be generated using a SQL trace utility. This, of course, does not teach obtaining execution trace information during the query either.

In response, the Final Office Action argues that the following passage of the Chaudhuri reference teaches the obtaining of trace records during queries:

> Index simulation
>
> Query optimizer 240 uses statistical information for each index of an index configuration to estimate costs of queries for the index configuration. Database server 220 gathers this statistical information for indexes currently existing in database server 220 and stores this statistical information as index entries 233 in a catalog table 232.
>
> Database server 220 and index selection tool 300 for one embodiment simulate the presence of indexes that do not currently exist in database server 220 so query optimizer 240 can estimate costs of queries for index configurations comprising one or more of such absent indexes. Database server 220 gathers statistical information for indexes absent from database server 220 and stores this statistical information as what-if index entries 234 in catalog table 232. For one embodiment, what-if index entries 234 are stored similarly as existing index entries 233 only what-if index entries 234 are marked with what-if index tags to distinguish what-if index entries 234 from existing index entries 233.
>
> During normal execution of database server 220 in accessing database 210 in accordance with various queries, query optimizer 240 ignores what-if index entries 234 and therefore generates execution plans over indexes currently existing in database server 220 only. For index selection tool 300 to consider both what-if indexes and existing indexes in evaluating candidate index configurations to select index configuration 302, index selection tool 300 may invoke query optimizer 240 in a design mode such that query optimizer 240 generates execution plans over both what-if indexes and existing indexes. Index selection tool 300 and database server 220 for one embodiment may need any administrator privileges as necessary to update catalog table 232.
>
> During normal execution of database server 220 in accessing database 210 in accordance with various queries, query optimizer 240 ignores what-if index entries 234 and therefore generates execution plans over indexes currently existing in database server 220 only. For index selection tool 300 to consider both what-if indexes and existing indexes in evaluating candidate index configurations to select index configuration 302, index selection tool 300 may invoke query optimizer 240 in a design mode such that query optimizer 240 generates execution plans over both what-if indexes and existing indexes. Index selection tool 300 and database server 220 for one embodiment may need any administrator privileges as necessary to update catalog table 232. (col. 7, line 45 - col. 8, line 10).

and reiterated:

For embodiments supporting SQL queries, workload 304 may be generated using SQL Trace utility, for example." (col. 5, lines 61-64)

The foregoing describes an index-simulation process that is used to estimate costs in a query optimizer. Even relying on impermissible hindsight reconstruction, the Applicants do not understand how the foregoing can be interpreted as teaching one to obtain trace records during queries.

The Final Office Action also fails to address the issue of whether there is any teaching to combine the Wygodny, Grimsrud, and Chaudhuri references. Wygodny is directed to monitoring and analyzing the execution of computer programs. Chaudhuri is directed to a database optimization technique. Although both involve computer processing, the two Wygodny and Chaudhuri references are at best, only remotely related. Simply put, there is no teaching whatever to modify Wygodny as the Final Office Action suggests. The Office Action argues that one of ordinary skill in the art would be taught to modify Wygodny:

> "to capture trace information about queries in order to have a convenient means for determining the processes that occurred during the query and the amounts of memory required by these processes."

However, there is nothing in Wygodny itself "facilitates tracing of execution paths" (see Abstract), and nothing in Wygodny indicates that it cannot keep track of memory requirements.

It is an easy matter to use the Applicants' disclosure to as a blueprint, search for limitations in multiple and marginally related or unrelated references, and use hindsight reconstruction to suggest advantages in combining them. The Patent Rules, however, require more. For the foregoing reasons, the Applicants respectfully traverse the rejection of claims 1, 2, 12, and 22.

2. The Rejection of claims 3-10, 13-20 and 22-30

Claims 3-10, 13-20, and 22-30 depend on independent claims 1, 11, and 21, and are patentable on this basis. Further, as described in the Applicants earlier remarks, these claims include limitations that are not found in the cited references, nor is there a teaching to combine the cited references as indicated.

3. The Rejection of claims 31-35

In paragraph 15 et seq., the Final Office Action rejected claims 31-33 as unpatentable over Chaudhuri, Wygodny, Grimsrud, and Hallmark. In paragraph 22, the Final Office Action rejected claim 34 as unpatentable over Chaudhuri, Wygodny, Grimsrud, and Hallmark, and further in view of Rust. In paragraph 23, claim 35 is rejected as unpatentable over Wygodny, Grimsrud, Chaudhuri, Hallmark, and Bamford.

The Applicants respectfully traverse these rejections. The rejection of claim 31-35 is improper for the reasons analogous to those presented above with respect to claims 1-30.

IV. CONCLUSION

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call the Applicants' undersigned attorney.

Respectfully submitted,

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